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|---|-------------|----------------------|---------------------------------|------------------|
| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.             | CONFIRMATION NO. |
| 10/649,040  | 08/27/2003  | Curtis E. Graber     | CUSTO-02004                     | 5139             |
| 28270 7590 04/20/2007<br>O'MALLEY AND FIRESTONE<br>919 SOUTH HARRISON STREET<br>SUITE 210<br>FORT WAYNE, IN 46802 |             |                      | EXAMINER<br>KURR, JASON RICHARD |                  |
|   |             |                      | ART UNIT                        | PAPER NUMBER     |
|   |             |                      | 2615                            |                  |
| SHORTENED STATUTORY PERIOD OF RESPONSE  |             | MAIL DATE            | DELIVERY MODE                   |                  |
| 3 MONTHS  |             | 04/20/2007           | PAPER                           |                  |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/649,040

Applicant(s)

GRABER, CURTIS E.

Examiner

Jason R. Kurr

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 January 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 10-12 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Danley (US 4,845,759).

With respect to claim 1, Danley discloses a loudspeaker comprising: an enclosure including a folded horn having a base end (fig.6 "end where throat #46 meets drivers #40,42,44") and a mouth (fig.4 #48); a summing throat forming a portion of the folded horn (fig.6 "portion where throats #46 meet"); a plurality of identical acoustic transducers housed in the enclosure (fig.6 #40,42,44); and a plurality of throats (fig.6 #46), with at least one throat associated with each acoustic transducer for coupling the output of the acoustic transducer into the folded horn; the throats being disposed at acoustically spaced locations along the summing throat from the base end forward toward the mouth (fig.2, col.2 ln.59-66).

With respect to claim 2, Danley discloses a loudspeaker as set forth in claim 1, further comprising: a source of an acoustic range signal (fig.3 "AMP"); and transducer drive signal processing circuitry (fig.6 #60) having an individual channel for each of the audio transducers, the individual channels each being coupled to receive the acoustic range signal and each channel including a time delay element (fig.3 #32) for delaying a

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signal in a channel as a function of the acoustic spacing of the throat for the audio transducer associated with the channel from the mouth of the folded horn to build an acoustic pressure front which builds in a cascade toward the mouth (col.2 ln.67-68, col.3 ln.1-15).

With respect to claim 3, Danley discloses a loudspeaker as set forth in claim 2, further comprising: a plurality of high pressure chambers (fig.6 #46), at least one acoustic transducer being positioned to direct sound energy into each high pressure chamber, each high pressure chamber further having an elongated port to the folded horn providing a throat for the high pressure chamber (fig.6).

With respect to claim 10, Danley discloses an apparatus comprising: a plurality of high pressure chambers (fig.6 #46) substantially the same volume (fig.6); an extended acoustic port (fig.4 #54) having a constant cross-sectional area from each high pressure chamber (fig.6 #46); a horn having a summing section (fig.6 "portion where throats #46 meet") and a mouth (fig.4 #48), the summing section comprising a base end (fig.6 "end where throat #46 meets drivers #40,42,44") of the horn furthest removed from the mouth and an elongated waveguide (fig.6 #46); the extended acoustic ports being connected into the summing section at acoustically spaced locations beginning at the base end of the horn and at serially closer locations to the mouth (fig.4); and a plurality of identical acoustic pressure wave generators (fig.6 #40,42,44), one of each being coupled to radiate into each high pressure chamber.

With respect to claim 11, Danley discloses the apparatus as claimed in claim 10, further comprising: means (fig.3 #32) for coordinating operation of the acoustic pressure

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wave generators so that the pressure waves from the radiating ends of the acoustic ports reinforce one another (col.2 ln.67-68, col.3 ln.1-15).

With respect to claim 12, Danley discloses the apparatus as claimed in claim 11, wherein the acoustic pressure wave generators are substantially identical transducers and are aligned side by side (fig.6).

With respect to claim 14, Danley discloses the apparatus as claimed in claim 11, the means for coordinating further comprising drive circuitry for the acoustic pressure wave generators including delay means (fig.3 #32) for synchronizing merger of the pressure waves upon their meeting in the summing section (col.1 ln.42-48).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4, 5, 9 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Danley (US 4,845,759) in view of Ohta (US 2001/0016045 A1).

With respect to claim 4, Danley discloses a loudspeaker as set forth in claim 3, however does not disclose expressly wherein each channel of the transducer drive signal processing circuitry further comprising: a band pass filter receiving the acoustic range signal and producing a filtered signal therefrom; the time delay element receiving filtered signal and producing a delayed, filtered signal; and a dynamic phase adjustment

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element receiving the delayed, filtered signal and adjusting the phase of the signal as a function of frequency to produce a drive signal for an acoustic transducer.

Ohta discloses a system for correcting a sound field in an audio system wherein a plurality of channels of a transducer drive processing circuitry (fig.2 #2) connected to respective speakers each comprise: a band pass filter (fig.2 "BPF 2-5") receiving an acoustic range signal (fig.2 #3) and producing a filtered signal therefrom, and a dynamic phase adjustment element (fig.2 "Delay Circuit") receiving the filtered signal and adjusting the phase of the signal as a function of frequency to produce a drive signal for an acoustic transducer (pg.4 [0055]).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the sound field correcting system of Ohta in the invention of Danley. The output of the band pass filter of Ohta would have supplied a filtered signal for the delay means of Danley, still allowing for adjustment in the dispersion pattern of the disclosed horn. Providing the additional phase adjustment element of Ohta would have allowed for the invention of Danley to compensate for various acoustic environments.

The motivation for using the sound field correcting features of Ohta in the invention of Danley would have been to allow the system to correct sound field anomalies resulting from imperfect acoustic environments, more specifically frequency and delay characteristics. This would provide a listener within the environment a more realistic reproduced sound, absent of distortions resulted from the acoustic environment.

With respect to claim 5, Danley discloses a loudspeaker as set forth in claim 4, further comprising: a summing section of the folded horn into which each throat is coupled (col.3 ln.35-46).

With respect to claim 9, Danley discloses a loudspeaker as set forth in claim 4 in view of Ohta, wherein the band pass filters, delay elements and dynamic phase adjustment elements are realized in a digital signal processor (Danley: col.3 ln.7-10)(Ohta: fig.2 #2, pg.3 [0036]).

With respect to claim 15, Danley discloses the apparatus as claimed in claim 14, however does not disclose expressly wherein the drive circuitry includes a pass band filter associated with each of the acoustic pressure wave generators and a dynamic phase adjustment element for each of the acoustic pressure wave generators.

Ohta discloses a system for correcting a sound field in an audio system wherein a plurality of channels of a transducer drive processing circuitry (fig.2 #2) connected to respective speakers each comprise: a band pass filter (fig.2 "BPF 2-5") receiving an acoustic range signal (fig.2 #3) and producing a filtered signal therefrom, and a dynamic phase adjustment element (fig.2 "Delay Circuit") receiving the filtered signal and adjusting the phase of the signal as a function of frequency to produce a drive signal for an acoustic pressure wave generator (pg.4 [0055]).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the sound field correcting system of Ohta in the invention of Danley. The output of the band pass filter of Ohta would have supplied a filtered signal for the delay means of Danley, still allowing for adjustment in the dispersion pattern of

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the disclosed horn. Providing the additional phase adjustment element of Ohta would have allowed for the invention of Danley to compensate for various acoustic environments.

The motivation for using the sound field correcting features of Ohta in the invention of Danley would have been to allow the system to correct sound field anomalies resulting from imperfect acoustic environments, more specifically frequency and delay characteristics. This would provide a listener within the environment a more realistic reproduced sound, absent of distortions resulted from the acoustic environment.

Claims 6-8 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Danley (US 4,845,759) "Danley1", in view of Danley et al (US 6,411,718 B1) "Danley2".

With respect to claim 6, Danley1 discloses a loudspeaker as set forth in claim 5, further comprising: the acoustic transducers having a small vibrational surface area relative to the predominant range of frequencies to be reproduced (fig.6 #40,42,44); however does not disclose expressly wherein the loudspeaker further comprises a plurality of sealed back chambers, one sealed back chamber housing each acoustic transducer.

Danley2 discloses a loudspeaker wherein the loudspeaker further comprises a plurality of sealed back chambers (fig.2C "not-labeled"), one sealed back chamber housing each acoustic transducer (fig.2C #50,52,46,48).



At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the sealed back chambers of Danley2 on the transducers of Danley1.

The motivation for doing so would have been to protect the drivers of the transducers from being damaged from external foreign objects.

With respect to claim 7, Danley1 discloses a loudspeaker as set forth in claim 6, further comprising: the audio transducers being positioned with respect to one another in a linear array, one to each high pressure chamber (fig.6).

With respect to claim 8, Danley1 discloses a loudspeaker as set forth in claim 6, further comprising: a plurality of acoustic transducers (fig.6 #40,42,44) coupled to each high pressure chamber (fig.6 #46).

With respect to claim 13, Danley1 discloses the apparatus as claimed in claim 11, however does not disclose expressly wherein the acoustic transducers are housed in sealed back chambers.

Danley2 discloses an apparatus wherein the acoustic transducers (fig.2C #50,52,46,48) are housed in sealed back chambers (fig.2C "not labeled").

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the sealed back chambers of Danley2 on the transducers of Danley1.

The motivation for doing so would have been to protect the drivers of the transducers from being damaged from external foreign objects.

### ***Response to Arguments***

Applicant's arguments filed January 3, 2007 have been fully considered but they are not persuasive.

With respect to the Applicant's arguments regarding claim 1 on pages 9 and 10 of the Remarks, the Applicant argues that Danley does not disclose a **folded** horn. The Applicant continues that a folded horn is a term that is used in the art and therefor well known. The Examiner would like to note that there are not universal guidelines as to the degree of bend in a horn that is required so as to be classified as a folded horn. Furthermore, the Applicant never defines in the claim language as to limit the meaning of "folded horn", therefor the Examiner is free to broadly interpret this term in any manner consistent with the term. In the present case, the horn as shown in figure 6 of Danley comprises numerous bends in the throat. These bends have been interpreted by the Examiner as folds, hence a folded horn.

Applicant continues to argue on page 11, that Danley simply does not show or teach enough structure to simultaneously meet the requirements of both a plurality of throats and a distinct summing throat. The Examiner disagrees with this assertion. It can clearly be seen in figure 6 that each acoustic driver #40,42,44 contains its own throat #46 that leads to a larger cavity (summing throat) of the horn. The acoustic waves emitted from the drivers are constructively combined in this portion of the horn so as to increase the output power of the horn through the combined efforts of multiple sources as disclosed by Danley (col.2 ln.33-51).

With respect to the Applicant's arguments regarding claims 3 and 10 on page 13 of the Remarks, the Applicant argues that Danley does not disclose a "high pressure chamber". The Applicant never defines or limits the structure of a "chamber" in the claim language; therefor the Examiner is free to broadly interpret this term in any manner consistent with the term. In the present case the acoustic throats #46 of Danley have been considered by the Examiner as chambers that receive high-pressure acoustic waves from the drivers #40,42,44, hence they are "high pressure chambers".

With respect to the Applicant's arguments regarding the Ohta US 2001/0016045 reference on page 14 of the Remarks, the grounds of the argument are unclear to the Examiner. The Applicant merely states "producing an effect at a particular point in an environment is not the same problem as producing a source which can radiate acoustic energy in a particular way". It is unclear to the Examiner as to how this pertains to the Ohta reference.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason R. Kurr whose telephone number is (571) 272-0552. The examiner can normally be reached on M-F 10:00am to 6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on (571) 273-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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